

CLAIMS

1. A method of activating a haptic output device of the kind responsive to signals defining directional force comprising receiving a series of signals defining a multiplicity of data packets, each packet defining a directional force applied at one location for transmission to the current location, determining from packet data the information defining a position to which a haptic output device is expected to move, using current positional data to generate output signals defining force and direction and applying a damping factor to said force and direction signals to slow the rate of movement from a previously defined position towards the current defined position.
2. The method of claim 1 further including signalling in each direction whereby haptic forces applied at one device in reaction to an applied force towards the current defined position are reflected to a corresponding device in the form of current positional signals in a series of return data packets.
3. The method of claim 1 or claim 2 further including calculating the damping factor from determined parameters of a transmission network on which said data packets are carried.
4. The method of claim 3 in which latency of the network is determined by transmitting a data packet to the network said packet including a time determinant identity, reflecting the data packet through the network and comparing the received time with the transmitted time to provide a latency parameter from which said damping factor is determined.
5. The method of claim 4 in which at least some transmitted packets carrying positional data also include the time determinant data, some of said time determinant data being returned to permit updating of the latency parameter.
6. The method of any one of claims 1 to 5 further including applying a weighting factor in addition to the damping factor, the weighting factor being derived from other parameters of the interconnection such as resilience.
7. The method of any one of claims 1 to 6 further including applying a modifying factor to the force and direction signals, said modifying factor being derived from pre determined user preference data.
8. An interactive haptic output terminal in combination with a bi-directional transmission arrangement, the terminal comprising at least a haptic output device and

control means, said control means receiving signals from said haptic output device to determine a current position for said device, and to determine from signals received from said transmission arrangement a preferred current position for said haptic output device, said control mean determining an output force and direction required to move  
5 said haptic output device from the current position to the preferred position and further modifying said output force and direction using a damping factor to slow apparent movement between the positions and outputting signals defining the modified force and direction.

9. A terminal as claimed in claim 8 in which the control means receives signals  
10 from the haptic output device, said signals containing data defining the position of said device at any particular time, said control means converting said data to signals for transmission to said bi-directional transmission arrangement at predetermined intervals.

10. A terminal as claimed in claim 8 or claim 9 in which the signals defining a  
15 preferred current position are generated by an environment simulator, for example a programmed computer.

11. A terminal as claimed in claim 8 or claim 9 in which the signals defining a preferred current position are generated by a corresponding interactive output terminal at the opposed end of the transmission arrangement.

20 12. A terminal as claimed in any one of claims 8 to 11 in which a series of packets defining preferred position are received, each packet defining a directional force applied at one location for transmission to the current location, the control means includes means to determine from packet data the sequence of transmission and re-ordering the data into a numerically correct series, extrapolating from  
25 previously received packets an anticipated linear movement to be defined by subsequently received packets and applying output directional force signals corresponding to said anticipated linear movement in respect of any missing data packet.

13. A method of activating a haptic output device as claimed in any one of  
30 claims 1 to 7 including signalling in each direction whereby haptic forces applied at one device in reaction to an applied force towards the current defined position are reflected to a corresponding device in the form of current positional signals in a series of return data packets.

14. An interactive haptic output terminal in combination with a bi-directional transmission arrangement, the terminal comprising at least a haptic output device and control means, said control means receiving signals from said haptic output device to determine a current position for said device, and to determine from signals received  
5 from said transmission arrangement a preferred current position for said haptic output device, said control mean determining an output force and direction required to move said haptic output device from the current position to the preferred position and further modifying said output force and direction by applying a damping factor to slow apparent movement between the positions and outputting signals defining the  
10 modified force and direction.

15. A terminal as claimed in claim 14 in which the control means receives signals from the haptic output device containing data defining the position of said device at any particular time and converts said data to signals for transmission to said bi-directional transmission arrangement at predetermined intervals:

15 16 A terminal as claimed in claim 14 or claim 15 in which the signals defining a preferred current position are generated by an environment simulator, for example a programmed computer.

17. A terminal as claimed in claim 14 or claim 15 in which the signals defining a preferred current position are generated by a corresponding interactive output  
20 terminal at the opposed end of the transmission arrangement.

18. A terminal as claimed in any one of claims 14 to 17 in which a series of packets defining preferred position are received, each packet defining a directional force applied at one location for transmission to the current location, the control means including means to determine from packet data the sequence of transmission  
25 and re-ordering the data into a numerically correct series, extrapolating from previously received packets an anticipated linear movement to be defined by subsequently received packets and applying output directional force signals corresponding to said anticipated linear movement in respect of any missing data packet.